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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte SAM BAGHDADI and ROBERT W. SUNSHINE

Appeal 2009-003418
Application 10/797,452
Technology Center 3600

Decided: October 26, 2009

Before JENNIFER D. BAHR, STEVEN D.A. MCCARTHY, and
MICHAEL W. O'NEILL, *Administrative Patent Judges*.

O'NEILL, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Sam Baghdadi et al. (Appellants) seek our review under 35 U.S.C. § 134 of the final rejection of claims 1-6, 9-16, and 19-20. Claims 7, 8, 17, and 18 are canceled. We have jurisdiction under 35 U.S.C. § 6(b) (2002).

The Invention

The claimed invention is to a turbine seal in order to form a seal between adjacent turbine components in a steam turbine in order to separate fluids and maintain the turbine's efficiency. Spec. 1:5-7.

Claim 1, reproduced below, is illustrative of the subject matter on appeal.

1. A turbine engine having a seal, comprising:
 - a plurality of blades extending radially from a rotatable body and generally forming at least one row of blades;
 - a plurality of blades extending radially from a stationary body towards the rotatable body and generally forming at least one row of blades;
 - a high pressure gas region in the turbine engine that is proximate to the plurality of blades extending radially from the stationary body and opposite to the plurality of blades extending radially from the rotatable body;
 - a low pressure gas region in the turbine engine that is proximate to the plurality of blades extending radially from the rotatable body and opposite to the plurality of blades extending radially from the stationary body, wherein the low pressure region has a pressure less than the high pressure region;
 - wherein the plurality of blades extending from the rotatable body and the plurality of blades extending from the stationary body form the seal between the high pressure gas region and the low pressure gas region;
 - wherein the plurality of blades extending radially from the stationary body are positioned proximate to the plurality of blades extending from the rotatable body and are nonparallel with the

plurality of blades extending from the rotatable body, and the plurality of blades extending radially from the stationary body are positioned at an acute angle relative to a rotational axis of the rotatable body in the at least one row of blades that is generally orthogonal to the rotational axis; and

wherein the plurality of blades coupled to the rotatable body are positioned to direct fluids from the low pressure gas region toward the high pressure gas region to limit leakage of fluids from the high pressure gas region proximate to the at least one row of blades coupled to the stationary body to the low pressure gas region proximate to the at least one row of blades coupled to the rotatable body.

The Rejections

The following Examiner's rejections are before us for review:

First, the Examiner's rejection of claims 1, 3-4, 9-11, 13-14, and 19-20 under 35 U.S.C. § 103(a) as being unpatentable over Gross (US 3,575,523, issued on Apr. 20, 1971) in view of Bunker (US 6,027,306, issued on Feb. 22, 2000) and further in view of Lösel (US 1,689,735, issued on Oct. 30, 1928).

Second, the Examiner's rejection of claims 2, 5-6, 12, and 15-16 under 35 U.S.C. § 103(a) as being unpatentable over Gross, Bunker, Lösel, and further in view of Albers (US 4,571,937, issued on Feb. 25, 1986).

Contentions

For the first rejection, Appellants contend that Lösel fails to teach a plurality of blades extending radially from the stationary body that are positioned at an acute angle relative to the rotational axis of a rotatable body

“in the at least one row of blades that is generally orthogonal to the rotational axis.” App. Br. 11-12. Appellants characterize Lösel’s intersection of the blade and the stationary support structure being orthogonal to the rotational axis; and the blade extending at an acute angle away from the base. App. Br. 12. In contrast, in the claimed invention, “the plurality of blades extending radially from the stationary body are positioned at an acute angle relative to a rotational axis of the rotatable body in the at least one row of blades that is generally orthogonal to the rotational axis...” *Id.*

For the second rejection, Appellants additionally contend that there is no teaching or suggestion to combine Albers’s blades with Gross or Bunker because Albers’s blades are used to redirect fluids flowing downstream of the turbine blades. App. Br. 14. Thusly, the proposed combination would yield a “pumping action of the blades on the rotational body [that] direct[s] fluids upstream and away from the blade of *Albers*.” *Id.* This is in contrast to the claimed configuration of blades that “direct[s] fluids towards the high pressure region and towards the blades extending from the stationary body.” App. Br. 14-15. Appellants further contend that the combination would not yield the claimed invention but instead would yield the stationary blades being positioned between the blades extending from the rotational body and the low pressure region. App. Br. 15. Further, there is no motivation found in Albers, Gross, and Bunker for a redesign. *Id.*

SUMMARY OF DECISION

We AFFIRM.

OPINION

Issues

In light of the Appellants' contentions against the Examiner's rejections, the issues before us are as follows:

1) Have the Appellants demonstrated that the Examiner erred in rejecting claims 1, 3-4, 9-11, 13-14, and 19-20 because the scope and content of Gross, Bunker, and Lösel fail to teach a turbine engine with a seal that has a row of blades that extend radially from a stationary body, which are generally orthogonal to a rotational axis of a rotatable body, and are positioned at an acute angle relative to the rotational axis?

2) Have the Appellants demonstrated that the Examiner erred in rejecting claims 2, 5-6, 12, and 15-16 because a person having ordinary skill in the art would find that the teachings of Albers are not compatible to the teachings of Gross, Bunker and Lösel?

Pertinent Facts

1. The pertinent part of claim 1 directed to issue (1) (with added reference numerals keyed to Appellants' drawing) is:

a plurality of blades [20] extending radially from a stationary body [14] towards the rotatable body [12] and generally forming at least one row of blades; ... and the plurality of blades [20] extending radially from the stationary body [14] are positioned at an acute angle [β] relative to a rotational axis of the rotatable body in the at least one row of blades that is generally orthogonal to the rotational axis;...

2. Appellants have not explained how a person having ordinary skill in the art would interpret the portion of claim 1 quoted above. App. Br. *passim*.
3. The Specification discloses that:

The seal 10 also includes a plurality of blades 20 extending from the stationary body 14 towards the rotatable body 12. The blades 20 may form a single row, as shown in Figure 2, or a plurality of rows. The blades 20 may also be aligned at an angle β of between about 1 degrees and about 89 degrees relative to a rotational axis 18 of the rotatable body 12. In at least one embodiment, the blades 16 may aligned at an angle of about 60 degrees relative to the rotational axis. The angles α and β are measured from the rotational axis 18.

Spec. 4:3-9.

4. Appellants' Figure 2 illustrates the sole embodiment disclosed in the Specification.

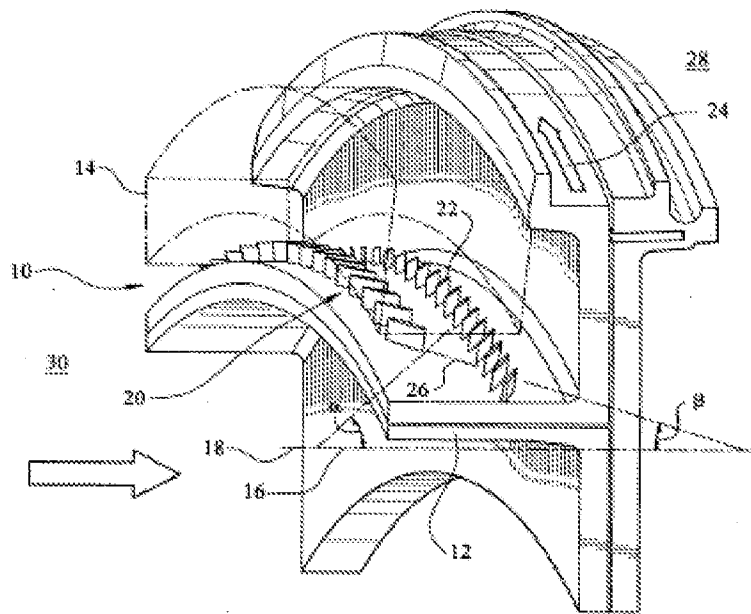


FIG. 2

Appellants' Figure 2 depicts the rotor and stationary portions of a turbine engine having a seal with the aspects of Appellants' invention.

5. As disclosed in the Specification and shown in Figure 2, the row of blades 20 extend radially from a stationary body 14 and are generally orthogonal to a rotational axis 18 of a rotatable body 12 and are positioned at an acute angle β relative to the rotational axis 18.
6. The Examiner found that Gross describes a plurality of blades 16 and 17 extending radially from a stationary body 15 toward a rotatable body 11, and blades 16 and 17 form a row of blades. Ans. 3.
7. We find that blades 16 and 17 extend toward a rotational axis of the rotatable body 11 because the Examiner has found that blades 16 and 17 extend radially toward the rotatable body 11. *See* Fact 6.
8. The Examiner found that Gross does not describe that the row of blades 16 and 17 are positioned at an acute angle relative to a rotational axis of the rotatable body 11. Ans. 4.
9. The Examiner found that Lösel describes on page 1, lines 65-70 a stationary member with a plurality of blades that are angled at an acute angle relative to a rotational axis of a rotatable body. *Id.*
10. Lösel describes on page 1, lines 65-70, that rings *d* have a series of rigid ring ribs *e*. The ribs *e* are wedge-shaped and inclined toward the left from the right angle position as shown in the figures. Figure 1 is reproduced below:

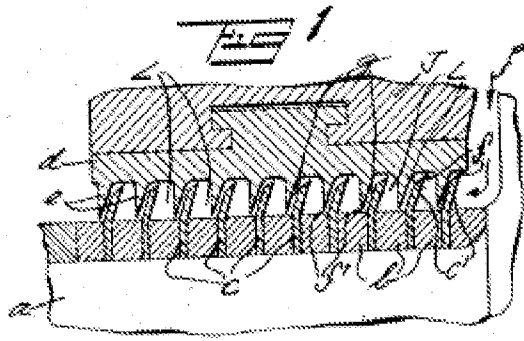


Figure 1 is a sectional view of a gland construction showing a ring *d* provided with ring ribs *e*. Figure 1 depicts ribs *e* inclined to the left from a line orthogonal to the shaft *a*.

11. The Examiner was not persuaded by Appellants' argument that Lösel fails to describe stationary blades that extend radially and generally form a row of blades where the blades are positioned at an acute axis relative to a rotational axis, because blades *C'*, as shown in Figure 2, form a row along a rotational axis and the blades are at an acute angle relative to the rotational axis of rotational shaft *a*. The Examiner's annotated version of Lösel's Figure 2 is reproduced below.

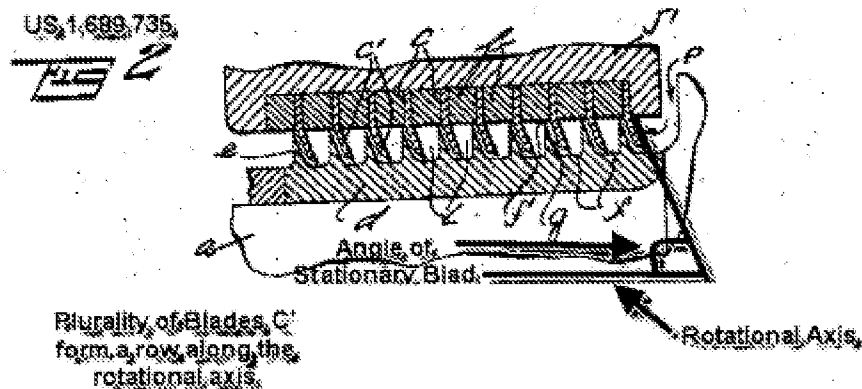


Figure 2 is a sectional view of another gland construction showing a ring *d* provided with ring ribs *e*. The Examiner's annotated Figure 2 depicts that blades *C'* form a row along the rotational axis of shaft *a*.

Principles of Law

A determination of obviousness involves two steps. The first is construing the claim, a question of law. The second is a comparison of the construed claim to the prior art. This comparison process involves fact-finding. *Key Pharms. v. Hercon Labs. Corp.*, 161 F.3d 709, 714 (Fed. Cir. 1998) (citations omitted). All words in a claim must be considered in judging the obviousness of the claimed subject matter. *See In re Wilson*, 424 F.2d 1382, 1385 (CCPA 1970). The PTO applies to verbiage of the proposed claims the broadest reasonable meaning of the words in their ordinary usage as they would be understood by one of ordinary skill in the art, taking into account whatever enlightenment by way of definitions or otherwise that may be afforded by the written description contained in applicant's specification. *See In re Morris*, 127 F.3d 1048, 1054-55 (Fed. Cir. 1997).

The question of obviousness is resolved on the basis of underlying factual determinations including (1) the scope and content of the prior art, (2) any differences between the claimed subject matter and the prior art, (3) the level of skill in the art, and (4) where in evidence, so-called secondary considerations. *Graham v. John Deere Co.*, 383 U.S. 1, 17-18 (1966). *See also KSR*, 550 U.S. at 407 ("While the sequence of these questions might be reordered in any particular case, the [*Graham*] factors continue to define the inquiry that controls.").

Analysis

Appellants argue the rejection of claims 1, 3-4, 9-11, 13-14, and 19-20 as a group. We select claim 1 as representative of this group to address whether Appellants have demonstrated an error on the part of the Examiner. Appellants do not separately argue the rejection of claims 2, 5-6, 12, and 15-16 as a group.

Claim Construction

When the claim limitations in dispute between the Examiner and Appellants are compared to the scope and content of the prior art of record, and are read in light of the Specification, one of ordinary skill in the art would interpret the claim limitations as at least one row of blades that extend radially from a stationary body, which are generally orthogonal to a rotational axis of a rotatable body, and are positioned at an acute angle relative to the rotational axis. *See* Fact 1-5. We next see if the prior art of record discloses, teaches, or suggests, in a turbine engine, at least one row of blades that extend radially from a stationary body, which are generally orthogonal to a rotational axis of a rotatable body, and are positioned at an acute angle relative to the rotational axis.

Issue (1)

The Examiner and Appellants take different positions as to what should be considered a row of blades. The Examiner's position is that the row of blades are the blades *e* or *C'* that, as shown in Figures 1 and 2 of Lösel, extend to the left and right of the page, and the acute angle is taken from an imaginary line drawn from *C'* to the rotational axis of shaft *a* as shown in the Examiner's annotated drawing of Figure 2. *See* Facts 10-11. Appellants counter that the row of blades are the continuous rings that

extend at an acute angle relative to a radial axis that projects from the rotational axis of shaft *a*.

The Appellants' argument does not persuade us that the Examiner's identifying the row of blades to be blades *e* or *C'* that extend to the left and right of the page as shown in Figures 1 and 2 is unreasonable. Nothing in Lösel precludes the Examiner's finding. A person having ordinary skill in the art would find it reasonable to consider the blades *e* and *C'* as shown in Figure 2 of Lösel, extending to the left and right of the page, to be a row of blades. As shown in the figures, this row of blades being on the stationary member (box ring *d*) is generally orthogonal to the axis of rotation of shaft *a*. Further, as the Examiner annotated, the distal portion of blades *C'* are angled to the right. Drawing an imaginary line, as the Examiner annotated, from the distal portion of a blade *C'* that would intersect the rotational axis of shaft *a* would yield an angle less than ninety degrees. An angle less than ninety degrees is an acute angle. Thus, Lösel teaches a row of blades generally orthogonal (proximal portion of blades *C'*) to a rotational axis and positioned at an acute angle relative to the rotational axis.

The Examiner then applied Lösel's teaching above to the combination with Gross. Previously, the Examiner found that Gross describes a plurality of blades 16 and 17 extending radially from a stationary body 15 toward a rotatable body 11, and blades 16 and 17 form a row of blades. As such, Gross disclosed a plurality of blades extending radially from a stationary body toward a rotatable body, with these blades forming a row of blades, while Lösel teaches a row of blades generally orthogonal (Gross's blades are likewise orthogonal) to a rotational axis and positioned at an acute angle relative to the rotational axis. "Common sense teaches . . . that . . . in many

cases a person of ordinary skill will be able to fit the teachings of multiple patents together like pieces of a puzzle... A person of ordinary skill is also a person of ordinary creativity, not an automaton.” *KSR*, 550 U.S. at 420-421. In this case, a person of ordinary skill could readily apply the teachings of Lösel’s row of blades at an acute angle relative to the rotational axis of the shaft *a* to Gross’s disclosed plurality of blades extending radially from a stationary body and toward a rotatable body, with these blades forming a row of blades. Therefore, the combination presented by the Examiner satisfies a row of blades that extend radially from a stationary body, which are generally orthogonal to a rotational axis of a rotatable body, and are positioned at an acute angle relative to the rotational axis, which is all that is required to satisfy claim 1.

Issue (2)

Appellants contend, in addition to the previous contentions regarding claims 1 and 11, that: Albers is not a seal system; and there is no teaching in the combination of Gross, Bunker, Lösel, and Albers to combine Albers with the former three references because Albers’s blades are used to redirect fluids flowing downstream of the turbine blade. Thusly, to Appellants, the combination of blades with the configurations disclosed in Gross and Bunker would yield blades on a rotational body with downstream blades on a stationary body for redirecting the downstream flow. As such, Appellants posit that the pumping action of the blades on the rotational body would direct fluids upstream and away from the blades of Albers. App. Br. 14.

The Appellants further posit that the Examiner’s combination would not satisfy having the stationary blades between the high pressure region and the rotational body; rather, Albers’s stationary blades would be positioned

between the low pressure region and the rotational body. App. Br. 14-15. Thus, Appellants posit that a redesign to reach the claimed configuration is not obvious because no motivation exists in the art or in the disclosures of Gross, Bunker, Lösel, and Albers.

The Examiner responds to the Appellants' contentions with that, even if Albers does not teach a seal, Albers is only used to teach that the blades on the stationary body are formed intermittently and are angled relative to the rotational axis (*see* Albers figure 1) and are annular spaced to form a row extending in an annular direction of the stationary member.

We addressed, *supra*, why Appellants' contentions against the rejection of claims 1 and 11 did not demonstrate error on the part of the Examiner and those remarks are incorporated herein. Likewise, Appellants' contentions with respect to the second rejection of the Examiner do not demonstrate error because the contentions focus on bodily incorporating all of Albers into the combination of Gross, Bunker, and Lösel. In obviousness determinations, all of the features of the secondary reference need not be bodily incorporated into the primary reference. *See In re Keller*, 642 F.2d 413, 425 (CCPA 1981). Moreover, the artisan is not compelled to blindly follow the teaching of one prior art reference over the other without the exercise of independent judgment. *See Lear Siegler, Inc. v. Aeroquip Corp.*, 733 F.2d 881, 889 (Fed. Cir. 1984). Accordingly, we conclude that an artisan exercising independent judgment would have had reason to rely on those teachings in Albers on which the Examiner has relied; apply those teachings to the combination of Gross, Bunker, and Lösel; and fit all those teachings together like pieces of a puzzle. Again, "[a] person of ordinary

skill is also a person of ordinary creativity, not an automaton.” *KSR*, 550 U.S. at 421.

CONCLUSIONS

1) Appellants have not demonstrated that the Examiner erred in rejecting claims 1, 3-4, 9-11, 13-14, and 19-20 because the scope and content of Gross, Bunker, and Lösel teaches a turbine engine with a seal that has a row of blades that extend radially from a stationary body, which are generally orthogonal to a rotational axis of a rotatable body, and are positioned at an acute angle relative to the rotational axis.

2) Appellants have not demonstrated that the Examiner erred in rejecting claims 2, 5-6, 12, and 15-16 because a person of ordinary skill in the art would find that the teachings of Albers are compatible with the teachings of Gross, Bunker and Lösel.

DECISION

The Examiner’s decision to reject claims 1-6, 9-16, and 19-20 is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a). *See* 37 C.F.R. § 1.136(a)(1)(iv) (2007).

AFFIRMED

Appeal 2009-003418
Application 10/797,452

mls

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